The author's reply:

Dr. Suter suggests [1] that the "factor of two agreement" between the chronic values (ChVs) and the 5-7dL tests fails to predict chronic effects using my criterion. However, his re-evaluation of the data was not done using the criterion as stated in the original paper [2]. It was important to realize that I was not using the ChVs to compare within a factor of two but rather the range of no observed effect concentration (NOEC) and lowest observed effect concentration (LOEC) which is evidenced by presenting the data as limits in Figures 2–6, and by the explanation in the first paragraph of the discussion [2]. I compared NOEC and LOEC limits because the ChV is dependent on the dilution factor used (e.g., 0.5 for many tests and 0.3 for many life cycle tests). The closer the concentration intervals in a test, the more likely it will be to have the NOEC of one test be the LOEC for another test; and ChVs are more likely to be different between tests if measured concentrations are used rather than nominal values. Therefore, that is why the factor of two discussion in the paper shows good agreement for the short-term test and the chronic test, i.e., for 69% of the tests the chronic toxicity was predicted. [Note: The comparison was made using data in Table 1 and two 7 d values from Table 3 ($n = 26$).]

Admittedly, for two of the five chemicals for which life cycle test data exist, the toxicity was underpredicted by a factor of 10 but explanations were postulated that this difference may be in the mode of action or the exposure conditions. To reiterate a point [2], the predictive capability of the subchronic tests can be assessed by comparing results with the previously reported life cycle results, which unfortunately have not been conducted more than once with the same chemical, species, and water to compare the reliability or reproducibility of the endpoints.

The second issue that Suter discusses is the magnitude of exposure and magnitude of effect as a valid basis for evaluating toxicity. Suter correctly points out that the hypothesis tests have peculiarities, therefore, a statistically significant effect may correspond to a large biological effect. He fails to mention that the statistically significant effect may correspond to a very small biological effect (i.e., 10%) as well. Suter then states that the short-term tests may not be protective when they agree with the life cycle test ChVs. The important point here is that the 7 d test limits did estimate that chronic toxicity occurred at the concentrations where fecundity was reduced in other tests [3,4]. Recent work has shown that even brief exposures of 5 h to chlorpyrifos at the 96 h LC50 concentration caused growth reduction and increased deformities, while 48 h exposures to endrin or fenvalerate at the 96 h LC50 caused reductions in growth for fish in 30 d early life stage exposures [5]. With many of the compounds, such as pesticides, the high concentrations are present for a brief time (1–4 d) and then rapidly decrease. Therefore, a sublethal toxicity estimate for the short-term test may be even more relevant than a full life cycle exposure. For those instances in which there is not a constant exposure—the 7 d tests allow measuring of replication and exposure which is missed with the life cycle test. In fact, the effect might be greater from a short exposure, which may be missed when the test is extended to a life cycle test.

In summary, I believe the short-term test is good not only for effluents, but also for new chemicals. We can test more species by running shorter tests and get an idea of the species' sensitivity. It is true we are not measuring the acute and the chronic toxicity per se, but rather estimating the toxicity. However, for each unit of research effort, we do better by establishing a safe environmental condition for more species and it is important to remember we are using short-term tests as tools in the environmental assessment of the hazards of new chemicals, effluents, sediments, hazardous wastes, and ambient waters.

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